

Psychometric properties of the Retrospective Self Report of Inhibition (RSRI) in a representative German sample

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Abstract

The present study examined the internal consistency, factorial structure, and construct validity of the German version of the Retrospective Self Report of Inhibition (RSRI), a questionnaire measure of behavioral inhibition. The research was based on data from a German prospective-longitudinal community study of 3021 adolescents and young adults (aged 14–24 years at baseline). Diagnostic assessment was based on the DSM-IV/M-CIDI and general psychopathological distress was assessed with SCL-90-R. Results of confirmatory factor analysis indicated adequate fit of the two-factor model, suggested by the authors of the original version. Indices of internal consistency of the RSRI and its subscales ‘social/school’ and ‘fear/illness’ were shown to be sufficient for the total sample and even higher in subgroups of subjects with certain DSM-IV diagnoses. Associations with variables such as mental distress, parental psychopathology, and DSM-IV disorders were in line with theoretical assumptions and confirm different aspects of the validity (convergent, concurrent, predictive) of the instrument. The psychometric properties of the German RSRI were found to be comparable to those of the English version. The applicability of this questionnaire in German-speaking countries is therefore recommended for adolescents and young adults. Copyright © 2008 John Wiley & Sons, Ltd.

Key words: behavioral inhibition, validation, confirmatory factor analysis, temperament

Introduction

Behavioral inhibition (BI) refers to a temperamental tendency of children to consistently react to unfamiliar events, both social and non-social, with initial fear, distress and avoidance (Kagan et al., 1984). It has been

estimated to be observable in approximately 10% to 15% of US white children, seems to be moderately stable across childhood, and is to some extent heritable (Kagan et al., 1984; Reznick et al., 1986). A number of studies, in which BI was assessed by direct laboratory

observation¹ of young children, reported associations between BI and parental psychopathology, namely agoraphobia and panic disorder (e.g. Battaglia et al., 1997; Mannasis et al., 1995), social phobia (Rosenbaum et al., 1991), depression (Kochanska, 1991; Rosenbaum et al., 2000) and alcoholism (Hill et al., 1999). Beyond these familial associations, an elevated risk for the onset of several mental disorders in individuals with childhood inhibition was found. Three independent studies (Biederman et al., 2001b; Hirshfeld et al., 1992; Schwartz et al., 1999) revealed an elevated risk for social phobia among children with BI. An increased risk level has been also found for other anxiety disorders, mostly those including other comorbid conditions (Biedermann et al., 1990; Biedermann et al., 1993) and depression (Caspi et al., 1996).

Because the laboratory paradigm is limited in its applicability, especially regarding cross-sectional studies, Reznick et al. (1992) developed the 'Retrospective Self Report of Inhibition (RSRI)' – a 30-item self-report questionnaire to measure BI without the classic childhood laboratory observation.

Reznick et al. (1992) found their instrument best described by a two-factor solution, as suggested by the scree plot and the principal component analysis. The first factor consisted of 12 items measuring social and school related fears and the second factor consisted of equally 12 items concerning general fearfulness and illness. Six of the 30 items remained without factor-assignment. This factorial structure could be replicated by Van Ameringen et al. (1998) on a sample of 225 anxiety-patients, whereas Hayward et al. (1998) proposed a three-factor solution ('fearfulness', 'social avoidance' and 'illness behavior') based on a sample of 2242 high school students. Internal consistency

coefficients of the total scale ranged from Cronbach's $\alpha = 0.79$ for college students (Reznick et al., 1992) to $\alpha = 0.90$ for anxiety disorder patients (Van Ameringen et al., 1998).

Four studies were carried out by Reznick et al. (1992) to validate the RSRI. In the first study an association between BI and mental problems was found in a sample of 98 students. In the second study the convergent, postdictive validity was investigated by asking the parents of the participants to fill out the questionnaire for their child. The correlation between the statements of the parents (about their child) and the statements of the participants (about themselves) was reasonable with a correlation of $r = 0.58$. Predictive validity was suggested with a moderate correlation of $r = 0.56$ between the RSRI and the Adult Self Report of Inhibition (ASRI; Reznick et al., 1992), an instrument which was constructed to assess the degree of BI in adulthood. In terms of the convergent validity, significant correlations with $r = 0.37$ between the RSRI-score and the subscale 'state-anxiety' of the State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970) and the Center for Epidemiologic Studies Depression (CES-D) scale with $r = 0.22$ (Radloff, 1977) were found, respectively. Additionally, significant correlations between the two RSRI-subcales and the STAI-subcales were reported. Discriminant validity is given as revealed by the finding that individuals with panic disorders (mean, $M = 2.24$; standard deviation, $SD = 0.58$) as well as individuals with depressive disorders ($M = 2.61$, $SD = 0.64$) showed higher RSRI-degrees than controls ($M = 1.91$, $SD = 0.54$) (Reznick et al., 1992). A similar pattern was found for the two subscales 'social/school' and 'fear/illness'. Several cross-sectional studies that assessed BI retrospectively via the RSRI revealed associations with social phobia and depressive disorders (Hayward et al., 1998; Mick and Telch, 1998; Neal et al., 2002). This is in line with studies assessing BI via childhood observation (e.g. Biederman et al., 2001b).

Aims of this paper are: (1) to examine, whether the two-factor model, suggested by the authors of the original version (Reznick et al., 1992) fits our German sample, (2) to describe the RSRI scales and demonstrate its internal consistencies, (3) to investigate different aspects of the validity. These aspects are (a) convergent validity (examining the association between BI and general mental distress), (b) concurrent validity (examining the connection between BI and parental major depression, dysthymia, panic disorder, alcohol related

¹The classic way to measure BI is the direct laboratory observation of young children in standard situations. Accompanied by its mother or father, the child will be confronted with a number of novel objects (new set of toys, a robot), people (other children, the investigator) and for a short period be separated from the parent. The reactions of the child will be recorded and evaluated on the basis of several quantitative behavioral parameters. A so-called 'BI-index', including among other aspects the latency to interact with the unfamiliar person or object and facial expressions of distress, determines the individual's degree of behavioral inhibition (Garcia-Coll et al., 1984; Kagan et al., 1984).

disorders and social phobia) and (c) predictive validity (investigating associations between BI and the subsequent onset of major depression, dysthymia and social phobia).

Methods

Sample and overall design

Data come from the baseline (t0) and all three follow-up assessment waves (t1, t2, t3) of the Early Developmental Stages of Psychopathology (EDSP) study, a prospective-longitudinal, general population survey of adolescents and young adults in Munich (Germany). As described in more detail elsewhere (Lieb et al., 2000; Wittchen et al., 1998b) this study was designed to collect data on the prevalence, incidence, risk factors, comorbidities and courses of mental disorders in their early stages.

The baseline sample was drawn randomly from 1994 government registries in metropolitan Munich and its surrounding counties in the age range 14–24. A total of 3021 interviews was completed at baseline (t0; response rate: 71%), $N = 1228$ at t1 (response rate: 88%, younger cohort only), $N = 2548$ at t2 (response rate: 84%) and $N = 2210$ at t3 (response rate: 73%). Additionally, independent diagnostic interviews were conducted at t1 with the parents ($N = 1053$, response rate: 86%), to gain information about familial psychopathology and the early development of the respondent.

RSRI scores were calculated as the mean of the endorsed items among those who had completed at least 50% of the items. This yielded for BI 'total' a total of $N = 3020$, for the 'fear/illness' scale $N = 3019$, and $N = 3018$ for the 'social/school' scale. A total of $N = 2925$ completed all 12 'fear/illness' and 12 'social/school' items that entered the confirmatory factor analysis; sample size therefore varies between $N = 2925$ and $N = 3020$ in this paper.

Diagnostic assessment

The degree of behavioral inhibition was retrospectively assessed during the baseline assessment with a German translation of the RSRI (Reznick et al., 1992). The questionnaire contains 30 items, which reflect five relevant areas: sympathetic nervous system activity, fear of specific situations, behaviors to alleviate fear, fears of unknown situations and behaviors, that reflect poor social skills. The RSRI items were translated into German by a bilingual German national and then

back-translated into English by a second bilingual German national in order to test for inaccuracies and ambiguities.

Psychological distress was assessed with the German version of the SCL-90-R (Symptom-Checklist-90-Revised; Derogatis, 1986), a frequently used 90-items instrument with three global indices and nine clinical subscales. Because high intercorrelations were found between the nine subscales in a study of Hessel et al. (2001) as well as in our sample (available upon request), only the three global indices ('global severity index', 'positive symptom distress' and 'positive symptom total') were considered in this paper.

The assessment of mental disorders was based on the computerized Munich-Composite International Diagnostic Interview (DIA-X/M-CIDI; Wittchen and Pfister, 1997). This reliable and valid instrument (Reed et al., 1998; Wittchen et al., 1998a) allows the collection of data on symptoms, syndromes, and diagnoses of 48 DSM-IV (Diagnostic Statistical Manual, fourth version) disorders along with information about onset, duration, and clinical and psychosocial severity. It includes a separate family history module to evaluate psychopathology in relatives of the respondents. In the present paper we used the follow-up incidences, assessed at t1, t2 and t3 defined as cases meeting the diagnostic criteria at any assessment (t1, t2 or t3) among those who did not yet report them at t0. Diagnostic estimates for parents were obtained using diagnostic information from two different sources: the family history data obtained from the DIA-X/M-CIDI family history module at baseline with the respondent ($N = 3021$) as informant, and the DIA-X/M-CIDI of the parent investigation ($N = 1053$), which provided direct M-CIDI/DSM-IV diagnostic information for the interviewed parent and family history data for the non-interviewed parent. Parental diagnostic estimates were derived by computer for the entire sample ($N = 3021$) on the basis of a priori established diagnostic algorithms (see Lieb et al., 2002).

Statistical analyses

Confirmatory factor analysis (CFA) was conducted to determine whether the two-factor solution suggested by Reznick et al. (1992) would adequately fit the EDSP sample. Hereby, factor loadings on other items were set zero while the expected loadings were allowed to vary; also, the latent factors were allowed to vary. As model fit indices we used the standardized-root-mean square (SRMR) index and the root-mean-square-error

(RMSEA): both are supposed to be preferred indices for assessing absolute model fit. Adequate fit is considered to be achieved when the SRMR value and the RMSEA value are both 0.08 or below (Hu and Bentler, 1999). To describe the RSRI-scale and its subscales, we calculated means, standard deviations, consistency coefficients (Cronbach's alpha), item-test-correlations, skewness and kurtosis. Because of the somewhat positively skewed distribution of the RSRI-scale, Spearman rank correlations were carried out to assess the inter-scale association as well as the association between the German RSRI and the SCL-90-R indices. To test whether individuals with parental psychopathology differ from individuals without parental psychopathology regarding their BI-levels, we compared the mean RSRI scores of these groups. The associations between BI (baseline) and DSM-IV disorders (cumulative follow-up incidences of major depression, dysthymia and social phobia, assessed at t1, t2 and t3) were assessed with odds ratios (ORs) from logistic regressions, while standardizing the BI scores ($SD = 1$) and adjusting to age and gender. As cases with the respective DSM-IV disorder at baseline were excluded from analyses, the sample size varies over the analyses ($N = 1934$ for major depression, $N = 2091$ for dysthymia, $N = 2062$ for social phobia). To conduct the CFA, we used Mplus by Muthén and Muthén (1998–2005). All other analyses were carried out using the STATA software package (Stata-Corp, 1984–2005). All data were weighted (besides rank correlations for which no weighting option exists) to adjust for differential probabilities of selection by age and for differential response rate based on the census population distribution of age, gender, and geographic distribution at baseline (Wittchen et al., 1998a). The Huber–White sandwich method for weighted data was used to adjust statistical inference for the weighting of the data (Royall, 1986).

Results

For the suggested two factorial ('social/school' and 'fear/illness') structure, the CFA results indicated adequate fit ($RMSEA = 0.06$; $SRMR = 0.06$). Figure 1 presents the model with standardized parameter loadings for item-to-factor relationships and factor correlations. The first factor loaded above 0.3 on 12 items related to school and other social situations, the second factor loaded above 0.3 on 12 items concerning general fear and somatic disturbances. Six of the 30 items remained, as in the original version, without factor assignment.

Means, standard deviations, internal consistency coefficients and median item-test correlations of the total BI-scale and the two subscales are reported in Table 1. Females reported higher BI 'total' scores (mean difference = 0.38, 95% CI = 0.30–0.46) as well as BI 'fear/illness' scores (mean difference = 0.57, 95% CI = 0.50–0.65). A normal distribution was found neither for the overall scale nor for one of the subscales. Internal consistency coefficients (Cronbach's alpha) are comparable to those of the original RSRI (BI total: $\alpha = 0.79$) and can be considered as acceptable. Notably higher coefficients were found for subsamples with certain DSM-IV-diagnoses, especially for obsessive-compulsive disorder, panic disorder and social phobia. Regarding the BI 'total' scale we found an internal consistency of $\alpha = 0.86$ for individuals with obsessive-compulsive disorder, of $\alpha = 0.83$ for individuals with panic disorder (with or without agoraphobia) and of $\alpha = 0.79$ for subjects with social phobia. Likewise, we found internal consistencies up to $\alpha = 0.82$ (panic disorder with or without agoraphobia) for the subscale 'social/school' and up to $\alpha = 0.77$ (obsessive-compulsive disorder) for the subscale 'fear/illness'. Internal consistencies for subsamples with other DSM-IV-diagnoses were not notably higher and are therefore not reported (available upon request).

To examine the convergent validity, we correlated the RSRI-scale and its two subscales with the three global indices of the SCL-90-R. As expected, moderate but significant correlations could be found between the RSRI and the SCL-90-R 'global severity index' [BI 'total': $\rho = 0.43$ ($p < 0.05$); BI 'social/school': $\rho = 0.26$ ($p < 0.05$), BI 'fear/illness': $\rho = 0.37$ ($p < 0.05$)], the SCL-90-R 'positive symptom total' [BI 'total': $\rho = 0.43$ ($p < 0.05$); BI 'social/school': $\rho = 0.28$ ($p < 0.05$), BI 'fear/illness': $\rho = 0.35$ ($p < 0.05$)] and the SCL-90-R 'positive symptom distress' [BI 'total': $\rho = 0.29$ ($p < 0.05$); BI 'social/school': $\rho = 0.14$ ($p < 0.05$), BI 'fear/illness': $\rho = 0.29$ ($p < 0.05$)]. To examine the concurrent validity, the relationship between BI and familial predispositions for psychopathology was analyzed. Table 2 shows BI-level group comparisons for participants with parental psychopathology and participants whose parents had not been diagnosed for any DSM-IV mental disorder. Individuals with all parental disorders under research showed higher degrees of BI for all scales.

In order to examine the predictive validity of BI, we investigated the associations between BI and incident

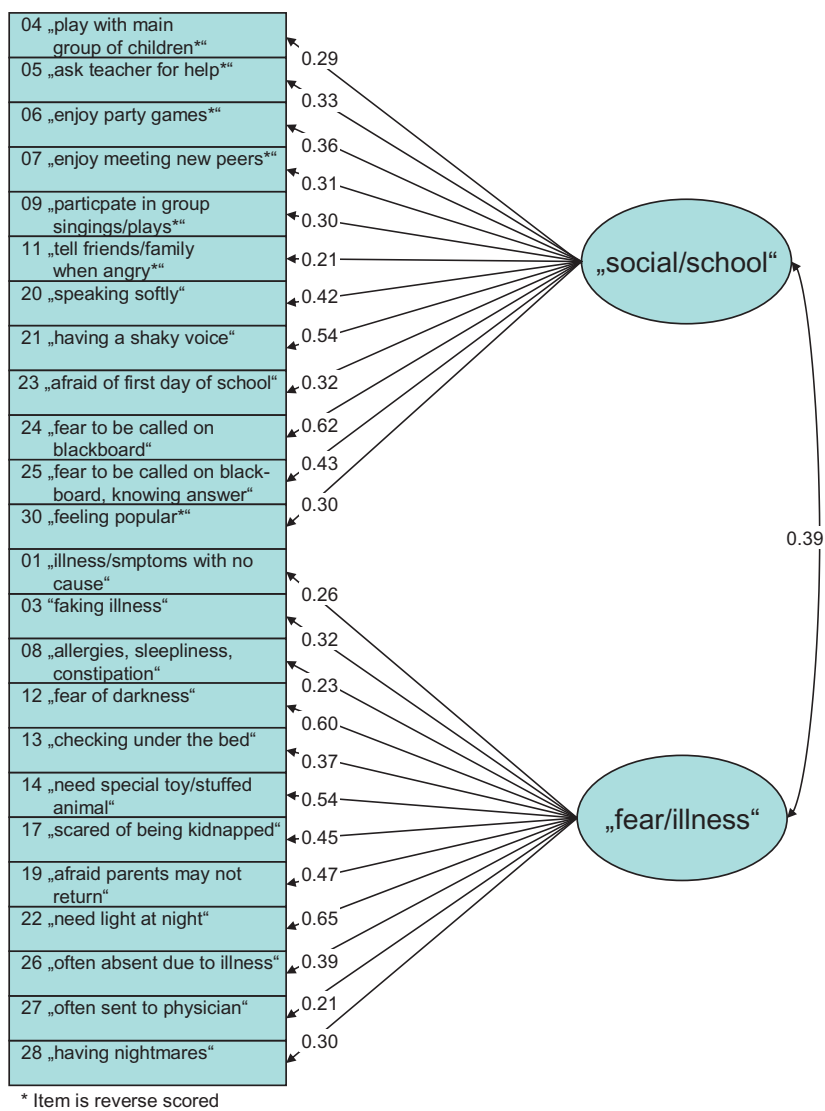


Figure 1. Factor intercorrelations and standardized loadings for the German RSRI (N = 2925).

Table 1. Means (M), standard deviations (SD), item-test-correlations (IT) and internal consistencies (α)

Scale	M	SD	IT (median)	α
BI 'total' (N = 3020)	2.11 σ 2.04 φ 2.17	0.34 0.30 0.37	0.36	0.74
BI 'social/school' (N = 3018)	2.29 σ 2.29 φ 2.29	0.48 0.43 0.52	0.48	0.70
BI 'fear/illness' (N = 3019)	1.88 σ 1.74 φ 2.02	0.49 0.41 0.52	0.49	0.69

social phobia, BI and incident dysthymia, as well as BI and incident major depression. Associations between prior BI and the subsequent onset of social phobia were found for the 'total' scale (BI 'total': OR = 1.68, 95% CI = 1.36–2.08) and the 'social/school' scale (BI 'social/school': OR = 1.88, 95% CI = 1.51–2.34). A significant relationship between BI and dysthymia was revealed for all three scales (BI 'total': OR = 2.16, 95% CI = 1.64–2.84; BI 'social/school': OR = 2.06, 95% CI = 1.62–2.63; BI 'fear/illness': OR = 1.65, 95% CI = 1.19–2.28). For major depression, associations were also found for all scales (BI 'total': OR = 1.43, 95% CI = 1.24–1.64; BI 'social/school': OR = 1.21, 95% CI = 1.04–1.40; BI 'fear/illness': OR = 1.48, 95% CI = 1.29–1.70).

Table 2. BI and parental psychopathology ($N = 3020$ for BI 'total'; $N = 3019$ for BI 'fear/illness'; $N = 3018$ for 'social/school')

Parental diagnosis	Scale	BI-means of subjects with parental psychopathology	BI-means of subjects without parental psychopathology	<i>p</i> -Value
Major depression	BI 'total'	2.16	2.04	<0.001
	BI 'social/school'	2.33	2.23	<0.001
	BI 'fear/illness'	1.96	1.78	<0.001
Dysthymia	BI 'total'	2.18	2.04	<0.001
	BI 'social/school'	2.33	2.23	<0.001
	BI 'fear/illness'	2.00	1.78	<0.001
Alcohol use disorder	BI 'total'	2.16	2.04	<0.001
	BI 'social/school'	2.35	2.23	<0.001
	BI 'fear/illness'	1.97	1.78	<0.001
Panic disorder	BI 'total'	2.18	2.04	<0.001
	BI 'social/school'	2.35	2.22	<0.001
	BI 'fear/illness'	1.99	1.78	<0.001
Social phobia	BI 'total'	2.15	2.04	<0.001
	BI 'social/school'	2.31	2.23	<0.001
	BI 'fear/illness'	1.95	1.78	<0.001

Discussion

The aim of the present study was to evaluate the psychometric properties of the German RSRI. For this purpose we examined the factorial structure, the internal consistency and the validity of the questionnaire. The two-factor model, suggested by the authors of the original version, could be confirmed for our German community sample. Results of the CFA indicated adequate model fit with factor loadings being comparable to those of the original RSRI (Reznick et al., 1992). Unlike Reznick et al. (1992) we found significantly higher scores of females than of males concerning the BI total scale and the subscale 'fear/illness'. This is, however, consistent with results of observational studies (e.g. Hirshfeld et al., 1992) and with the general tendency of females to be more prone to social inhibition and anxiety (Craske, 2003). Because our sample differs from the one used in the study of Reznick et al. (1992) regarding nationality and other important demographic variables like age and education, it is unclear, whether this discrepancy can be attributed to the inequality of the two samples (population based sample versus student sample) or to cultural differences.

The internal consistency patterns found in our study are comparable to those of the original RSRI (Reznick et al., 1992) and can be regarded as still sufficient, with few item exceptions. Interestingly, we found

much higher internal consistency values for several diagnostic subgroups, most of all panic disorder, social phobia and obsessive-compulsive disorder. Because this phenomenon was also found in American samples (Van Ameringen et al., 1998), the question arises, why the RSRI seems to be more internal consistent for samples with psychopathology than for samples without psychopathology. An examination of the item-test correlations showed, that the average item-test correlations of individuals with the earlier mentioned DSM-IV diagnoses were higher than those found for the total sample. Because higher item-test correlations consequently lead to higher alpha-values, we expect the different internal consistencies to be caused by a different relation between the single item and the total test score. We assume that the higher item-test correlations are due to a more homogeneous answering style of individuals with certain mental disorders, indicating a lower 'BI threshold' for those. Individuals without psychopathology might show stronger affirmations for some of the described situations (e.g. Items 23: 'Did it upset you to be called up to the blackboard?') than for others (e.g. Item 24: 'Did it upset you to be called up to the blackboard, even if you knew the answer?'), whereas individuals who have been diagnosed for panic disorder or obsessive-compulsive disorder might recall the different situations as almost equally frightening.

A broad range of aspects of construct validity was affirmed by our results. Convergent validity was supported by the moderate correlations between the RSRI and the three global indices of the SCL-90-R. This confirms the general finding of Reznick et al. (1992), that BI is related to suboptimal adult mental health. The concurrent validity was supported by the finding, that children with parental psychopathology show higher RSRI degrees than children without parental psychopathology. We could successfully replicate findings of associations between BI and parental panic disorder (Battaglia et al., 1997; Mannasis et al., 1995; Rosenbaum et al., 1988; Rosenbaum et al., 2000), parental depression (Kochanska, 1991; Rosenbaum et al., 2000), parental alcohol disorder (Hill et al., 1999) and parental social phobia (Rosenbaum et al., 1991).

The association between BI and social phobia (Biederman et al., 2001b; Hirshfeld et al., 1992; Schwartz et al., 1999) and depression (Caspi et al., 1996) could be supported by our findings, as well. We found significantly heightened risk levels for the subsequent onset of social phobia, dysthymia and major depression in a large community sample – a strong support for the predictive validity of the questionnaire.

A limitation of this work is the lack of data about the stability of the German RSRI. Because BI was only measured once in the EDSP study, the retest-reliability could not be examined. It was further not possible to examine discriminant validity, an important aspect of validity. Because the EDSP study was designed to assess psychopathology of adolescents and young adults, no constructs, that are known to be theoretically unrelated to BI, have been assessed. Another limitation concerns the age range of our sample. Findings are only representative for adolescents and young adults. Because of less accurate childhood memories, psychometric indices for retrospective measurements could differ for elder individuals.

Altogether, the current investigation revealed that the German RSRI can be considered structurally stable, internally consistent and a valid instrument. Further, because a German translation of the RSRI was used, the cross-cultural and cross-lingual validity of the instrument as well as the underlying construct could also be demonstrated. Based on a large representative sample, our results clearly support the applicability of the German RSRI. However, the general question whether retrospective self reports, respectively autobiographic memories, are accurate enough to reflect past

childhood behavior without too much bias has not been resolved yet. Future research should therefore use longitudinal data to compare direct child observations with adult self reports (RSRI) on these individuals.

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Declaration of Interests

The authors have no competing interests.

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